THOUGHTS

ON

AMPUTATION.

BEING A

SUPPLEMENT TO THE LETTERS

ON

COMPOUND FRACTURES,

AND

A COMMENT on Dr. BILGUER's Book on this Operation.

TO WHICH IS ADDED A

Short ESSAY on the Uſe of OPIUM in MORTIFICATIONS.

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Veritatem volo, præterea nihil.

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PREFACE.

*WHEN I publiſhed my Letters on Compound Fractures, I did what appeared to me neceſſary and proper; and ſeeing writers in general have miſunderſtood Dr. Bilguer on amputation, I have, from the ſame motive, taken pains to ſet him in the light he ought to be placed, that his book may not be entirely neglected, and thrown aſide, and the community deprived of ſome benefits that may be derived from his publication. Indeed it muſt be confeſſed, that Dr. Bilguer, if the tranſlation is right, has not expreſſed his meaning ſo clearly as it might, or ought to have been done; and for want of a full explanation, has ſet a face upon his writings, which, at firſt ſight, makes an unfavourable impreſſion; nor can he be rightly underſtood without a thorough examination, and comparing one part with another. The title-page prefixed by Dr. Tiſſot is not a tranſlation of Dr. Bilguer's title-page *, is no ways appoſite to the contents of his book, and tends to miſlead the reader.*

* Diſſertatio inauguralis Medico-chirurgica de Membrorum Amputatione, rariſſime adminiſtranda, aut quaſi abroganda, &c. Which is tranſlated, A Diſſertation on the Inutility of the Amputation of Limbs.

Perhaps

Perhaps it has hence been read with a prejudice natural to an apparently inconſiſtent propoſition; or it may probably have been only dipped into, or ſkimmed over, as unworthy of notice. Otherwiſe, it is impoſſible to account for ſome groſs miſrepreſentations, which muſt appear liable to cenſure. From the diſguiſe in which Dr. Bilguer's book appears, I own I miſtook his meaning, with reſpect to his indiſcriminately forbidding amputation, when I wrote the Introduction to my Letters on Fractures; and I am glad of an opportunity of doing him that juſtice his merit deſerves. The ſhort Eſſay on the Uſe of Opium in Mortifications, is intended as an addition to what has already been written upon this ſubject.

ERRATA.

Page 16. note, *for* Warren, *read* Warner. P. 30. line 2. *after* contuſion, *add* of. P. 34. l. 27. *for* it is, *r.* is it. P. 39. l 2. *for* efficaces, *r.* efficacies. P. 45. l. 26. *for* this, *r.* the. P. 46. note, *for* arment, *r.* armament. P. 56. l. 22. *dele* after. *For* anaſtomiſing, *r.* anaſtomoſing. *For* ſchirrhus, ſchirrhi, *and* ſchirrhous, *r.* ſcirrhus, ſcirrhi, *and* ſcirrhous.

THOUGHTS

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AMPUTATION.

SURGERY, properly ſo called, has, no doubt, been much improved in this century; and the medical part of this branch of the profeſſion has been ſimplified in ſome inſtances with advantage, but in others, ſo much as even to throw away many valuable and neceſſary parts of practice; along with the rubbiſh. It may clearly be demonſtrated, that the cure of external diſeaſes by medicaments has degenerated, as attention to performing manual operation has taken place; and that theſe diſtinct offices do not always, as they ought to do, go hand in hand. However, it muſt be confeſſed, we have reduced the trouble in curing many accidents, by reverſing the plan of the ancients. The old ſurgeons, in their deſcription of diſeaſes, &c. very properly firſt conſidered the means of preſerving limbs, in accidents where there was any probability of ſucceed-

ing; and operations were their laſt reſource: whereas, in theſe enlightened days, we begin the chapter with the knife and ſaw, and thus, without a moment's loſs of time, reduce the tedious and troubleſome work, of attempting to ſave a limb, to ſimplicity. From unfortunate events, this ſhort way of going to work, with utter contempt of information, is promoted with vigour by men of high rank * in their profeſſion; and it is ſaid, "a contrary doctrine has been propagated and "employed, to the prejudice of mankind, by "covering ignorance and timidity, and alſo, for "ſerving the baſe purpoſe of malevolence;" which is a cenſure that muſt ſtimulate thoſe, who are concerned in it, to a defence. Were amputation difficult, ſome of theſe aſperſions might have the appearance of truth; but a man muſt be very ignorant indeed, who cannot take off a leg, an operation to be performed by any blockhead; accordingly it is done daily by unfeeling men of very confined abilities, who are no ways capable of preventing the neceſſity of ſuch an operation. And whether of the two, the operator, or one capable of curing without operations, is a man of moſt ſkill? Certainly, if it ſhould appear from practice, of which I have no doubt, that more limbs may be preſerved than has hitherto been imagined, other motives than ignorance and timidity

* up to yond hill,
Your legs are young: I'll tread theſe flats. Conſider
When you above perceive me like a crow,
That it is *place* which leſſens and ſets off.

will

will ſeem to have given riſe to the doctrine, which oppoſes precipitate amputation; and in matters of ſcience, truth ought not to be repreſented as a cloak for malevolence. Yet, perhaps, the above reaſons in favour of amputation may be eagerly followed far and wide, by thoſe who pay implicit obedience to the authority of great names.

Nevertheleſs, it is not from a great or little name, that a judgment of men's opinions ſhould be formed; but as they are right, and accord with truth; of which we ſhould judge by plain and ſimple facts. No man, in general, is more to be believed than Hippocrates; and yet when he tells us, that if a tendon is cut aſunder, it will not grow together again, we know he was miſtaken, owing perhaps to his proceeding upon an ill-founded general opinion, to his not being acquainted with the right way of managing this accident, or to his being led to make an unfavourable prognoſtic, from his patient being placed under very unfavourable circumſtances. And it is not very unlikely, that the dreadful account we have had of the event of bad compound fractures, where amputation does not take place, may be owing to ſome of theſe cauſes.

Now, that amputation ſtands upon as fixed and as rational principles as any part of ſurgery, and that it will ever be a uſeful and neceſſary remedy, under certain circumſtances, cannot be denied; but that it might frequently have been diſpenſed with, where it has been employed, is, I

believe, equally true. Thoſe therefore, in my opinion, have done right, who have endeavoured to perſuade practitioners againſt precipitately performing this operation, eſpecially as operations, it is ſaid by thoſe who have opportunities of knowing, are the great, and almoſt only object, ſtudents in ſurgery purſue: and becauſe they were taught to believe, that unleſs amputation was immediately performed in *bad compound fractures*, a mortification, or a large ſuppuration, with formation and lodgment of matter, which would hazard the life of the patient, and frequently kill him, would be the conſequence, without a line being drawn betwixt thoſe caſes; where amputation is, and is not neceſſary. Wherefore, we will attempt to ſupply this deficiency, that what we have already written upon this ſubject may not, from any thing that has ſince been ſaid, appear to be groundleſs and vain.

When a limb has by any means received ſo violent an injury, that the bones are ſhattered to pieces, and the muſcles and ligaments, &c. are ſo bruiſed and torn, that, the veſſels being deſtroyed, there is no poſſibility of a future circulation in the part, or that, though capable of being kept on, would at laſt be uſeleſs, after a long and hazardous cure, it has generally been thought right, and I believe it is right, to remove it immediately. The only objections of force are, that it is unneceſſary to remove it by cutting through the ſound parts, and that the patient much ſeldomer recovers, when the operation comes upon the back of the

the accident, from the united ſhock given to the nervous ſyſtem, than when it is delayed ſome time *. On the other hand, there are many well known reaſons for a contrary procedure; and in the few caſes I have met with, in which the operation was immediately neceſſary †, from the violence of the injury, I have followed the practice of taking off the limb in the common way, as ſoon as I could, and with good ſucceſs. Even Dr. Bilguer amputates in theſe inſtances; and we will juſt enquire into his mode of proceeding.

Indeed, as what he ſays is manifeſtly delivered with a good intention, and is the reſult of uncommon public experience, it ought, I think, to be attended to. His ſituation afforded him the moſt deſperate and proper caſes for trial; and though his intentions of cure might be purſued with more eligible remedies, yet he is, no doubt, a moſt able ſurgeon, and we cannot ſee any reaſon for rejecting his opinion with contempt, except we miſtake his meaning, and ſuppoſe that he condemns the practice of removing diſeaſed or injured limbs, by an operation, in all caſes whatever.

* See Mr. Boucher's paper on gun-ſhot wounds, Mem. Royal Acad. Surg. Paris, vol. ii. Neal's Tranſ. p. 285.

† Excepting the fingers, I have only met, in my own practice, with three inſtances. Two happened from the burſting of guns, which tore the hand and wriſt all to pieces. The other was in a compound fracture of the leg, in a man eighty years of age, and in which the injury was of that kind, that there was no poſſibility of keeping the leg on. And I met with another inſtance, under the care of another gentleman.

The

The principal aim of his book is to ſhew, "*That parts which have ſuſtained the moſt conſi-*
"*derable injuries, will much oftener get well, than*
"*what is commonly believed.*" Of courſe he amputates but very ſeldom; never, if poſſible, in the ſound parts, on account, as he ſays, of the needleſs pain that accompanies it; and as it is not done in the uſual way, he thinks it cannot be called amputation. Wherefore, when he ſays amputation may be *almoſt totally diſpenſed with*, he means *amputation in the common manner.* And though the patient loſe his limb, yet the manner of loſing it makes a material difference to him. In the common way, when the operation is performed in the ſound parts, horrid pain, and a dangerous ſhock to the habit, are unavoidable conſequences. In the other, danger of freſh injury from an operation is avoided, and little or no pain is added to the accident, which are circumſtances that will ever have their due weight with men of feeling.

Dr. Bilguer endeavours to demonſtrate, "*That*
"*the caſes wherein amputation is neceſſary are much*
"*leſs frequent than has been hitherto ſuppoſed*; *and*
"*that it may even be almoſt totally* * *diſpenſed with.*"
And for this purpoſe, he begins with enumerating thoſe *accidents* for which amputation has hitherto

* I have never ſeen the original, but ſuppoſe the word *totally* is a ſtronger expreſſion than the text warrants, becauſe in the title-page which Dr. Tiſſot copies, we ſee he uſes the words, *aut quaſi abroganda.*

been

been deemed neceſſary, and theſe he reduces to ſix inſtances; but he means not to ſhew, as has been repreſented, that amputation is totally and abſolutely unneceſſary, and wrong in them.

Firſt, *A mortification which ſpreads until it reaches the bone.* Or, (to explain this text) Mr. Sharp ſays, "A *ſpreading mortification* has been "always looked upon as ſo principal a cauſe for "amputation, that it is a faſhion with all writers "to treat of the nature of a gangrene, previous "to this operation; and I think they have all "agreed, that whatever the ſpecies of it be, if "the remedies they preſcribe do not prevent "its progreſs, the limb muſt be amputated." Which doctrine he rejects, and proves, that amputation ſhould not take place till the mortification is ſtopped. Dr. Bilguer's meaning is exactly the ſame; and when he tells us, ſection the ſeventh, that his treatment of mortified limbs has convinced him, that amputation is not neceſſary *, he certainly only means, that it ſhould not be employed *to ſtop the progreſs of the diſeaſe.* It is evident, this improvement in practice had not taken place in Pruſſia when he wrote: he ſurely did a good office in teaching it. He ſays, he does not condemn the amputation of what is abſolutely mortified, but only contends, that it

* This paſſage will appear to be a wrong tranſlation, and that it ought to be read in the manner we have corrected it, if we compare it with what is ſaid in the 35th, 36th, and 37th pages of his book.

ſhould

ſhould not take place while the diſeaſe ſpreads, or while the patient is feveriſh; and proves, from obſervation, that the greateſt number of ſucceſsful caſes happened, when amputation was performed late, and when the diſorder had abated naturally. He accordingly attempts to ſtop the progreſs of the diſeaſe, by external and internal remedies, (which he deſcribes from the 9th to the 35th page) inſtead of amputation; and when this point is accompliſhed, he conſiders whether the limb can be preſerved or not. If not, he takes it off, either by cutting through the ſound, or mortified parts, as the particulars of the caſe require; for if the patient is very weak, and incapable of undergoing an operation, he lops off all the uſeleſs maſs near to the quick, without touching it, and afterwards endeavours to ſtop the progreſs of the infection by internal medicines, ſuitable dreſſings, and a ſtrengthening regimen; and after a ſeparation betwixt the dead and living parts has taken place, he ſaws off the bone. And would not moſt men in their ſenſes act *nearly* in the ſame manner, as cutting through the parts above, which are probably in a more irritated ſtate than ordinary, may bring on a variety of ill conſequences, or even death? The caſe quoted by Dr. Tiſſot, from Mr. Ranby* on this occaſion, is exactly in point; for the Auſtrian officer died with the *tetanus* in conſequence of amputation, after the mortification had ſtop-

* On Gun-ſhot Wounds, p. 70.

ped;

ped; and who would probably have lived, had the bones only been ſawed through, betwixt the living and dead parts. I have conſtantly, for many years, followed this practice, whenever I had occaſion to remove a mortified limb; and I lately met with a very good inſtance, in ſupport of ſuch procedure. A woman had a mortification ſeized her hand and wriſt, from violence of inflammation; and ſpread itſelf within three or four inches of the elbow, before I ſaw her. However, it now luckily ſtopped; and beſides the dreſſings to the ulcer, we applied antiſeptics to the dead parts, to prevent their giving us trouble. The ſurgeon, and the relations of the woman, now wiſhed to have the arm taken off above the elbow, but I pointed out to them ſome inconveniences, which I had ſeen from cutting through parts lately inflamed; and that we ſhould make equally as good a cure, by ſawing through the dead bone, as by performing a painful, unneceſſary, and hazardous operation. Accordingly, waiting till there was ſufficient room for the ſaw, we cut through the bone, without pain, or without giving the leaſt freſh trouble to the patient. The ſkin, and ſome of the muſcles, being left lower, on the back part of the arm, the ſurgeon turned them up over the bone by degrees, and made, much to his ſatisfaction, a very good cure. I am very certain, every humane man, after making the experiment, will think the only exceptionable part of what Dr. Bilguer has ſaid

about amputation in mortified limbs, is, his operating ſometimes in the ſound parts.

Secondly, Any limb *ſo greatly hurt, whether by fracture, or dilaceration, that there is room to dread the moſt fatal conſequences, a mortification, and death.*

This article he conſiders in two points of view; where there is no probability, and where there is a probability, of ſaving the limb. If it is ſo ſhattered and torn, that there is no probability of ſaving it, he cuts it off by dividing the injured parts, that keep it hanging together, which have very little feeling. He then ſaws off the ends of the bones, carefully removes all ſplinters, and having reduced it to the ſtate of a ſimple contuſed wound, he dreſſes it with digeſtives, &c. And may not much pain to the patient be ſaved, and a good cure be made, in a multiplicity of inſtances, by this treatment? Would Wiſeman * have recommended this very practice, had it not anſwered his end? When the fingers are ſo maſhed, that they cannot be kept on, we frequently make good cures by this method; and I do not ſee any reaſon, why it will not in general hold good in other inſtances.

But theſe deſperate caſes in compound fractures, requiring immediate amputation, if I may judge from plain matter of fact (except made by gun-ſhot) are indeed very few. I have only ſeen two of them in full forty years practice. Mr.

* Book 6th, chap. 5th.

Gooch,

Gooch, who ſaw a great deal of buſineſs of this ſort, in a longer period, was equally fortunate, as he informed me by letter; and almoſt all the ſurgeons within the circle of my acquaintance, who have been properly initiated in buſineſs, are happy enough to be in the ſame predicament, notwithſtanding many of them have not wanted ſufficient opportunities of experience. And Wiſeman, who preſſes immediate amputation in gunſhot wounds of the joints, never once mentions the neceſſity of this treatment, in compound fractures made by common accidents. The ſame may be ſaid of Parey, and the chirurgical writers on each ſide of him, up to Hippocrates and down to Turner, on fractures with comminution. Heiſter only talks of amputation, when a deep *ſphacelus* has invaded the limb: and I can remember forty years ago, that in theſe accidents in the country, this treatment was ſeldom or never thought on; whereas the utility of amputation, to prevent misfortunes in bad compound fractures, is the *alpha* and *omega* of a modern book. Perhaps it may be ſaid, that the old ſurgeons were forced to take pains, and to turn out their patients with uſeful legs, becauſe they did not cleverly know how to take them off; but had they been as expert with the knife as the ſurgeons in theſe days are, they might have ſaved themſelves a great deal of trouble. Nevertheleſs, if they really could cure them by the methods deſcribed, which are very different from thoſe to be met with in modern books, this art in ſome places may be ſaid to be

loſt. The injury, where immediate amputation is required, is of that violent nature, that it cannot be miſtaken; the deſtruction of the parts, and the impoſſibility of their being ſaved, is evident at firſt ſight. All ſurgeons have agreed to amputate under ſuch circumſtances; even the unexperienced cannot be miſtaken, and any excitement to this work is quite unneceſſary. There is no doubt, but mortification, and perhaps death, might be the conſequence of not amputating in ſuch inſtances; but as they ſo rarely happen, I am ſorry to ſee pictures of death and deſtruction frequently hang out, becauſe they may ſtrike a dread on young practitioners, and prevent their attempting the preſervation of limbs, where there is a probability of ſucceſs. I am perſuaded however, writers have acted as ſucceſs directs them; and we ſhall alſo proceed upon the ſame principles.

But the accidents juſt mentioned are not thoſe in diſpute; and if it is inſiſted on, that theſe are the certain circumſtances under which ſpeedy amputation in compound fractures is propoſed, we are getting off part of the ground upon which we firſt ſtood, and the writers againſt ſpeedy amputation ſeem to be gaining their point; for *bad* and *hazardous* compound fractures, and fractures of the *fibula*, with a compound diſlocation of the *tibia* at the ancle, were heretofore included in the number of caſes requiring this treatment; and we know it was an uſual practice, where the bone was ſhattered, and made its way through a large wound,

wound, and where the muſcles, &c. were conſiderably bruiſed and torn at the ſame time, to whip off the member, becauſe there was more hazard in attempting to preſerve the limb, than in taking it off. Or even in caſes where much leſs injury was done, the epithets *bad*, and *hazardous*, without full explanation have a very vague meaning, and give a moſt unwarrantable latitude of uſing the knife, to timid and ignorant men; for thoſe who have not made the medical *, or as ſome call it, the curative part of ſurgery, the chief object of their attention, do not know how to encounter difficulties and diſcouragements, and being fearful of ſucceſs, have recourſe to that method, which requires but very little trouble and ſkill; and accordingly, many accidents barely coming within this deſcription, have, I am perſuaded, never been ſuffered to undergo any attempt in a different method of cure: and yet it is a notorious fact, that in the caſes we have juſt enumerated, in pure air, and under proper treatment, high fever, intenſe inflammation, gangrene, and mortification, very ſeldom happen; that the patients do not often periſh by means of their wounds, and that they are almoſt conſtantly cured, when *well* managed, without amputation.

In regard to compound diſlocations of the *tibia* at the ancle, from what I have ſeen ſince I wrote

* By medical ſurgery we mean the dreſſing of ſores, the hand and medicaments both being employed at the ſame time.

on

on this ſubject, I do believe, when the head of the bone is removed, that a mortification, or indeed any other dangerous ſymptom, ſo rarely happens, that the mentioning of them here may be ſaid to be out of place; and that whatever alarms, and thereby prevents an attempt to preſerve the limb, leads us from that method, which ought to be purſued. A limb, when it has received a very bad compound facture, may not be ſo violently injured, as to be rendered incapable of being reſtored to its proper office; for though the circulation through the muſcles may, from laceration, have the appearance of being ſtopped, yet, the lacerated and divided parts being laid together, the veſſels very ſoon inoſculate, and a cure follows. Wherefore, we are to compare the injury with the ſimilar accidents; and if, from the aſpect of the part, it ſeems not to be worſe than ſuch as have generally recovered, I will be bold to ſay (and truth may at any time be ſpoken with boldneſs, without cenſure) we ought not precipitately to amputate. Nor is an attempt to ſave limbs, though violently bruiſed and ſhattered, which experience teaches may be cured, repugnant to common ſenſe, or can it be productive of much miſchief to mankind. Surely it is right to attempt a cure, where there is ſome probability of doing it, as we are not to regulate our conduct by conſidering, whether there is moſt hazard from amputation, or the accident. For a man will be willing to run ſome hazard in an attempt to preſerve the limb, if there is any likelihood of

its

its being ſaved; and therefore, according to the advice of Wiſeman *, we ſhould conſider well the member, and only amputate immediately, *where we have no probable hope of a cure.* And who can or dare defend immediate amputation, in any other circumſtances?

Among the writers of obſervations, we find many inſtances where the patient, not ſubmitting to immediate amputation, even in very deſperate compound fractures, a perfect recovery, contrary to all expectation, has happened; fairly evincing, that the ſteps nature is capable of taking, to reſtore injuries in the ſeveral parts of the body, ſurpaſs all kind of reaſoning, except that by compariſon and analogy; and therefore, thoſe advantages have not been derived from ſuch recoveries, as might have been wiſhed, or expected; it being imagined, they were only eſcapes, and too extraordinary to be made precedents of. But Dr. Bilguer has ſhewn the contrary; for of all compound fractures thoſe by gun-ſhot in general are the worſt, and yet when a ball, &c. ſhatters a limb, that the part may be moved any way, and ſeems to hang uſeleſs, without coming within the former predicament, he makes the wound, or wounds, ſufficiently large, lays the bone bare, removes as many ſplinters as poſſible, with his fingers and a proper ſaw, together with all extraneous bodies, and thus brings the wound into as ſimple a ſtate, as the nature of the injury will permit; and if he was ſucceſsful in theſe caſes, are they not ſufficient

* Book vi. chap. 5.

to prove his firſt propoſition? Almoſt every man muſt have ſeen limbs, which have received a compound fracture, that might be moved any way, and ſeemed to hang uſeleſs *, recover; and I cannot therefore help favouring his opinion. In the coal mines, ſome years ago, I conſtantly ſaw ſuch violent compound fractures recover, which nothing but experience could have induced me to believe. I then firſt learned, how readily a new circulation would begin, betwixt bruiſed and divided parts, when laid together: and I wiſh ſurgeons would attend to this circumſtance, as they will have the pleaſure of ſeeing nature do more than they from reaſoning could expect. The immediate inoſculation in ſimple wounds, has always been known, but that the ſame thing happens in contuſed and lacerated wounds, I firſt clearly ſaw, more than thirty years ago, in a collier's leg, upon which an immenſe weight of coal had fallen, made ſeveral large, lacerated wounds, ſhattered the bones, bruiſed, and divided the muſcles in a miſerable manner. I had before

* The wheel of a loaded waggon run over a boy's leg, juſt below the *gaſtrocnemii* muſcles; preſſed about three or four inches of the *tibia* clean out (both ends being almoſt as level as if they had been ſawed) through a lacerated wound: the *fibula* was maſhed to pieces, and the foot, no doubt, ſeemed to hang uſeleſs. Mr. Warren of Leiceſter, then with me, had the management of the limb, the firſt dreſſing; and I never ſaw a compound fracture cured with ſo much eaſe, owing to the ſimple ſtate it was reduced to, by the entire removal of the bones, the accident having effected what Dr. Bilguer effects by his knife, and ſaw, &c.

been frequently concerned in the cure of limbs, bruiſed, torn, and ſhattered by the wheels of loaded waggons, &c. paſſing over them, but I never had ſeen ſo horrid an accident as this of the kind; and imagining it impoſſible to ſave the limb, I adviſed immediate amputation. The man was too much in liquor to ſay any thing to the propoſal: his wife and the coal-bailiff inſiſted that the operation ſhould not take place, and I began the cure, without hopes of ſucceſs, by waſhing out the coal-ſlack; but the greateſt part remained to get at liberty by digeſtion, being driven into the very ſubſtance of the fleſh. I then removed all the looſe ſplinters of bone, which could eaſily be done, there being room enough for the purpoſe; and then laying all the bruiſed and divided parts together as well as I could, I dreſſed the patient in the uſual manner. But I was aſtoniſhed at my future dreſſings, to ſee how ſoon an adheſion in the divided parts, and a new circulation took place, and in ſhort, the coal-ſlack, which had even given blackneſs to the muſcles, digeſted out, and the patient was cured with leſs trouble than I could have imagined, after he returned to his uſual way of living; for upon keeping him upon low diet, a few days in the beginning, the ulcer, though it digeſted kindly enough at firſt, began to look ragged, and gleeted; he loſt his appetite, and had reſtleſs nights. But finding he had been a very hard drinker, I ordered him a quart of ale a day; and from this time every thing went on perfectly well, notwithſtand-

ing he exceeded his allowance ſo much, as to be often fuddled; fairly evincing, that uſe is a ſecond nature, and that even bad cuſtoms muſt, in ſome meaſure, be complied with, or we loſe our patient.

From this time I proceeded by comparing in my mind one accident with another; and though the bones were much ſhattered, the ſoft parts much bruiſed, or the wounds large, provided the limb was not in the predicament firſt mentioned, I never was diſappointed in making a cure, that was not much better than a wooden leg. Mr. Rowe had no conception of keeping on the leg in the compound fracture, ſuch as Mr. Mudge * deſcribes; and yet we ſee with what eaſe the patient was cured by the fortunate ſtep he took in the beginning, which excluded the air. It is another of thoſe caſes, which ſhew that amputation in theſe accidents has been oftener performed than was neceſſary; and, I doubt not, will have its due weight among ſenſible men †. Nor does the want of ſucceſs in other people's practice invalidate what Dr. Bilguer has ſaid; becauſe it is not an accidental caſe or two that he inſtances, but the experience he delivers to us was gradually accumulated; one ſtep of nature led on to another, till he found ſhe would go farther with aſſiſtance than was imagined. His cures were known to a great number of phyſicians and ſurgeons in the army; and the multiplicity of deſperate compound frac-

* On Catar. Cough, p. 220.

† See alſo a caſe in Mr. Clare's book on Abſceſſes.

tures,

tures, which muſt of courſe have happened during a war, which afforded him more than ſix thouſand wounded men at one time, gave him more opportunities of obſerving facts, than fall to the ſhare of thoſe unconnected with military employment. And ſhould we ſhut our eyes againſt this information? The opinions of the ableſt ſurgeons in the world cannot overturn facts: if facts ſhew us, that more dangerous compound fractures will admit of cure than has been believed, why are we not to attend to them?

After the hœmorrhage is ſtopped, the worſt conſequence that can be apprehended, Dr. Bilguer ſays, is mortification, which he is not afraid of, becauſe he expects to prevent it, or to ſtop its progreſs when it appears: and inſtead of acquieſcing in opinion, that this cannot be done, it is worth enquiring, whether he has juſt reaſons for ſuch expectations.

When a mortification accompanies a compound fracture, it muſt ariſe either from the violence of the injury; from the violence of the ſubſequent ſwelling; from the corroſive ichor, occaſioned by extravaſated blood, &c. ſtagnating in the part; from a bad habit of body; or from all theſe cauſes united: but the three firſt inſtances only fall under conſideration, as in the latter it can ſcarcely, I think, be prevented, by taking off the limb, on account of a gangrenous diſpoſition previous to the accident; whereas the former are local, and theſe he moſt likely alludes to, when he ſpeaks of ſucceſs, becauſe local gangrenes are com-

monly flow, as he deſcribes, and there is time for applications to take place, unleſs they happen very near the body. Others, we know, are of a different opinion, and aſſert, that mortification in theſe accidents, when once begun, will be too quick for remedies, and therefore urge the neceſſity of ſpeedy amputation, to prevent what may not happen; or if it does happen, the odds are greatly in favour of its being local, and not killing the patient. Indeed there is one kind of local gangrene, which is very quick in its progreſs, and, unleſs prevented taking place, will ſoon end in death. It is not peculiar to compound fractures, but happens ſometimes in violent contuſions, accompanied with a ſmall wound, and does not deſtroy the patient altogether by acrid matter being abſorbed, and bringing on putrefaction, but from its ſeizing the nerves in the neighbouring parts, and, like the Indian poiſon, though not ſo quick, occaſions death, by its ſedative influence upon the whole nervous ſyſtem. And this, perhaps, may be ſaid to conſtitute that very kind of caſe, in which amputation ſhould have been immediately performed. But who can tell before hand that there is any likelihood of its happening? It very rarely occurs; and were we to prevent it in compound fractures, by amputation, we muſt cut away without mercy, and do a great deal of that kind of buſineſs which ought not to be done. A man had his leg fractured; a wound, more than an inch long, was made by the broken bone being raiſed through the ſkin,

and

and mortification and death were in a few days the conſequence. But who can with propriety ſay, that amputation ſhould have taken place immediately, to prevent this fatal termination? Nor could it have been juſtified, for the reaſons juſt given, becauſe compound fractures, thus circumſtanced, for the moſt part recover without amputation, and becauſe the operation is equally dangerous with the accident. However, when I call to mind, that I never ſaw a local mortification which killed the patient, where the injury made very large openings, I am apt to think, that Dr. Bilguer's being ſo very free with his knife in the beginning, is a main point in inſuring him ſucceſs; for unleſs the wound is of ſuch a nature, that the air may be excluded, its being large gives liberty to the parts, admits an eaſy extraction of ſplinters, a free diſcharge, convenient dreſſings, and prevents abſceſſes, &c. I have conſtantly obſerved, that compound fractures, accompanied with large, lacerated, and even contuſed wounds, are cured with more eaſe, than thoſe where the wound is ſmall, and made only by protruſion of the bone; and I have therefore, where I could not ſucceed by the firſt intention, taken care to have ſufficient openings: and the queſtion is, whether in compound fractures mortification may not as effectually be prevented by large and timely openings, when neceſſary, as by taking off the limb?

Dr. Bilguer admits, that every patient was not ſaved by his method of proceeding; and it is reaſonable

ſonable to ſuppoſe that he loſt ſome, who might have been cured by amputation: but, on the contrary, there is reaſon to believe, he preſerved many limbs, which, in the uſual way of going on, would have been cut off. If a mortification made amputation neceſſary in the end, it was done often without freſh pain, and there remained no doubt whether the limb could have been ſaved or not.

Of all compound fractures, thoſe of the joints are the worſt, becauſe of the conſequence of inflammation of the membranes and ligaments, and of the heads of the bone becoming foul, eſpecially when made by gun-ſhot. Wiſeman ſays, "it "was counted a great ſhame among the chirur- "geons in the navy, if diſmembering the patient "in this ſituation was left till next day." And ſurgeons in general have acceded to this practice, ſuppoſing fatal conſequences are unavoidable, except by amputation; and perhaps they may have judged right, where the common method is purſued: but if a bullet has made its way into one ſide of the joint of the elbow or knee, and by that means ſhattered ſeveral bones at one ſtroke, Dr. Bilguer treats it by dilating the wound, cutting away lacerated tendons, and extracting the ſplintered bones. He ſays, the wounds get well, like other compound fractures. This aſſertion was made in the face of many, who were capable of contradicting him, if falſe. And is not his evidence much ſtrengthened by Mr. Boucher's papers on gun-ſhot wounds complicated with fractures,

tures, either at or near the articulation of the extremities* ? And have thoſe who condemn this practice ever tried whether it is right or wrong ? or do they proceed to amputation, from dreading that nothing elſe can be done, becauſe the common method of proceeding has failed ? Removing the heads of the bone mitigates the ſubſequent ſymptoms amazingly. In ſeveral inſtances which have come to my knowlege, where they were taken away through a large contuſed wound in *one ſide* of the joint, at the elbow, ancle, and wriſt, though the other ſide was greatly injured, the patients were cured without any ſymptoms of conſequence; or where the wound was ſo large, and ſo ſituated, that matter could not lodge in the joint, though the ends of the bone were not taken away, they recovered, undergoing pain from neighbouring abſceſſes, without danger. And it may be worth conſidering, whether his boldneſs, in making large openings through the capſular ligaments, and cutting away lacerated tendons, is not an improvement in the art.

Large wounds in the membranes, we know, are not, for the moſt part, attended with the ſame trouble as thoſe which are ſmall; and large openings may be made through them, for the diſcharge of matter, with ſafety and advantage. A ſmall wound through the capſular ligament, for inſtance, in the ſide of the patella, in the upper part of the knee, may occaſion the loſs of the limb, or death, by matter forming in the

* Mem. Royal Acad. Surg. Paris.

joint,

joint, &c. but if, when we ſee matter begin to collect, a depending orifice is made, a train of horrid ſymptoms will often be prevented, and the recovery of the limb moſtly the conſequence *. And in all the inſtances I have ſeen, where the wound in the joint was ſo large, that matter could not lodge, a colliquative fever did not ſupervene; nor did the ſymptoms of putrefaction in the part riſe ſo high as when the wound is ſmall, owing, perhaps, in ſome meaſure, to air not being confined. When, in wounds connected with the tendons, the tendons are entirely removed, all troubleſome and dangerous ſymptoms are prevented, as we learn from Marchettis, 57th obſervation, where the tendons of the thumb were torn away by the bite of a horſe; by ſimilar inſtances in other writers; and by cutting the tendons away, when we perform amputation juſt above the ancle. And although by this procedure in wounds of the joints, the action of ſome part of the limb is aboliſhed, yet it ſimplifies the injury, and a ſtiff limb is better than no limb at all.

Nevertheleſs, though I have ſaid the heads of the bones, at the upper and lower end of the *os humeri*, the upper and lower end of the *radius*,

* It is the buſineſs of the ſurgeon, in ſuch an accident, to prevent, if poſſible, ſuppuration, by excluding the air: for there cannot be any doubt, but it is the effect of this fluid which occaſions moſt of the miſchief in wounds in the tendons and ligaments, as the different ſymptoms following a rupture in the *tendo Achillis*, with and without a wound, evince.

and

and *ulna*, and the lower end of the *tibia* and *fibula*, may be taken away in accidents, yet I muſt confeſs, I have had no experience myſelf of this being done in the lower end of the femoral bone; and unleſs a ball, or any other accident, breaks it off, I do not ſee how it could be taken away through a wound, without an operation that would be worſe than taking off the limb. Perhaps it is from ſuch accidents that Dr. Bilguer's concluſions were drawn, or he may have become expert in an operation, which, for want of practice, appears to us to be difficult; and I would not therefore depend upon reaſoning on the nature of things, which too frequently evinces, that we do not underſtand them. But ſuppoſe a caſe to happen, ſuch as Wiſeman deſcribes, where the patient was ſhot through the knee. "The "bullet entered in by the lower and exterior ſide "of the *rotula*, and paſſing through the joint, "out in the hollow of the ham, tore the liga- "ments and nerves, and fractured the joint as it "paſſed, rending the artery in going out. There "was no poſſibility of conveying any inſtru- "ment, whereby he might thruſt or pull out "the ſhivers, if any ſuch were, between the "heads of the joint. Pain, fever, putrefaction, "delirium, ſpaſm, and death, were the conſe- "quences." It may be aſked, what but amputation could have prevented this cataſtrophe? According to Dr. Bilguer's method, "making "large openings, or perhaps by entirely exclud- "ing the air." I would firſt try this laſt expe-

dient, as I am perſuaded it would be found highly uſeful in particular caſes, in gun-ſhot wounds. After all, accidents may and will happen to the joints, in which none of theſe ſteps can take place with advantage; and if they fall within the deſcription at p. 4, or if a caries of the heads of the bones, or a colliquative fever, cannot be prevented by openings, amputation or death muſt be the conſequence.

But there is another period in compound fractures, in which amputation has been thought indiſpenſably neceſſary. When the ulcer, inſtead of contracting, remains as large as at firſt, with a tawny, ſpongy, ſurface, diſcharging a large quantity of thin ſanies, inſtead of a ſmall one of good matter, when the bones, inſtead of uniting, &c. remain perfectly looſe, and diſunited, as at firſt, and the patient loſes his ſleep, and has a colliquative fever. But it is a main point in the cure of compound fractures, to prevent this ſtate, otherwiſe it is almoſt certain, it will be all over with the patient, and the ſurgeon will frequently want ſucceſs, whether he amputates or not. If we begin the cure by reducing the patient's ſtrength much, by free and frequent bleeding, purging, and extreme low diet, it may ſoon be out of our power to hinder this ill diſpoſition taking place; and when this happens, a generous plan of diet, with the bark and cordials, will moſtly come too late. Nor is bleeding, or weakening the patient much, proper or neceſſary for promoting the digeſtion of the wound, if the limb be

be properly managed; but this cannot always be done, by leaving nature to accompliſh her own purpoſe, without proper aſſiſtants. And I do believe, when I ſee the practice propoſed in ſome books, for the cure of compound fractures, that the reducing, or antiphlogiſtic treatment, has been longer continued than the injury itſelf required, to ſubdue febrile ſymptoms conſtantly kept up by dreſſings, no ways capable of preventing, or aſſiſting to remove inflammation and its conſequences.

We ſhould have an eye to the patient's general ſtrength, and to the ſtrength of the affected part from the beginning, inſtead of having this to do when perhaps it is incapable of being done; which treatment we have before hinted at; and this method of proceeding may perhaps be one reaſon of Dr. Bilguer's ſucceſs, for, at the very onſet, he guards againſt lowering the patient. He ſuppreſſes, and keeps within proper bounds, the diſcharge from the ſore; and he endeavours to prevent an abſorption of matter, and to ſtrengthen the limb by bandages. And I apprehend we ſhall not loſe time, if we juſt inquire into the propriety of his keeping the injured member ſurrounded with cloths, conſtantly moiſtened with ſpirit of wine.

I know the uſe of ſpirits has been condemned in the cure of gun-ſhot and other wounds; and, if applied when the part is in a ſtate of great inflammation, I think they will do harm, becauſe I have known a local *ſphacelus*, of conſiderable ex-

tent, brought on by the application of tincture of myrrh to an inflamed wound. However, ſpirit of wine does not bring an inflammation where the part is not already inflamed; and perhaps, when it is applied round the dreſſings, before the inflammation comes on, it may have a good effect. It is a powerful ſedative, and may render the nerves nearly inſenſible to irritation, and thus prevent great inflammation, and its conſequences.

This remedy has long been recommended in ſlight burns, and in ſlight *eryſipelata*, as capable of preventing and ſubduing inflammation; and I have ſeen it in both theſe inſtances, in a very ſhort time, remove all appearance of the diſeaſe. I likewiſe once ſaw it give the moſt inſtant relief in a *ſlight* inflammation about the anus, from which a clear hot ichor was diſcharged, attended with exceſſive itching, and moſt agonizing pain; all which, I imagine, it produced by leſſening, or taking away, the ſenſibility of the nerves. But I cannot recommend this practice, under the preſent ſtate of a compound fracture, from my own experience; and therefore, only offer theſe hints to the conſideration of thoſe gentlemen who are diſpoſed to reflect upon Dr. Bilguer's ſucceſs. If it ſhould be found uſeful, in bringing about the effects deſcribed, we have ſtill more to expect from it, as it will preſerve the ſtrength of the limb, prevent a circumſtance much to be attended to, large ſuppuration, and, being a powerful antiſeptic, it may do good ſervice by this property. But whatever may be the advantages before inflammation

flammation is come on, they can no ways recommend its uſe where it has taken place, nor till ſufficient relaxation gives it an opportunity of being applied with ſafety. And now we are upon the ſubject of ſpirituous dreſſings, we ſhall advert to the uſe of tincture of myrrh, &c. which, after being much uſed in theſe accidents, is laid aſide, becauſe it was ſaid to be applied as a ſtimulus, to aſſiſt nature in throwing off the diſeaſed parts; which is like deſpiſing a man who has undeſervedly a bad name, without examining into his actions. Nor is this the only inſtance, by hundreds, where a valuable remedy has been kicked out of doors, from being connected with a fooliſh theory. But whoever examines into the matter, will find that myrrh, inſtead of irritating, is a powerful ſedative; that it is a good antiſeptic; and that, being united with the ſpirit of wine, it forms a ſtrengthener. Wherefore, being applied in theſe accidents, after all kind of inflammation is gone off, both together give a natural ſenſation to the ſore, they correct putrid acrimony, render it incapable of acting upon the ſound parts, give nature an opportunity of puſhing off from the living fibres whatever is offenſive, and they criſp up relaxed fibres, and thus leſſen the diſcharge; all which things dreſſings of this claſs are known to effect. Nor am I at all ſurpriſed at thoſe wanting ſucceſs, who are unacquainted with theſe circumſtances, who leave the whole to nature, and who entirely neglect the principal uſe that may be made of bandage.

Thirdly,

Thirdly, *A violent contuſion the ſoft parts, which has at the ſame time ſhattered the bones.*

But what does Dr. Bilguer do in this inſtance? Why, he bleeds, and purges, and endeavours by every means, both external and internal, to promote an abſorption of the extravaſated blood, &c. and when the ſwelling ſubſides, he places the bones in as good a poſition as he can, and finiſhes the cure in the common manner. And is this repugnant to the univerſal ſenſe of all the ableſt and beſt practitioners, to common ſenſe, or to conſtant experience? Mr. Freke *, above thirty years ago, in ſpeaking of the effects of air in compound fractures, ſays, "Though the bones, in a "ſimple fracture, be ever ſo much *macerated*, it "ſeldom or never, with proper care, fails of "doing well." Mr. Mudge †, lately upon the ſame ſubject, ſays, "We frequently meet with "ſimple fractures of the leg, where both the "bones have been broken with the greateſt cir-"cumſtances of violence, where they have been "ſplintered, where they have been nearly puſhed "through the ſkin, and where, by the appear-"ance of the *ecchymoſis*, or leakage from the "torn veſſels, the violence and laceration of the "parts have undergone, are ſometimes demon-"ſtrably as great as they can, and frequently "more than they actually do receive in a com-"pound fracture. But notwithſtanding all this, "if the limb is not injured by motion, or band-

* Art of Healing, ſect. 3. † Catar. Cough, p. 213.

"age,

" age, but left as nearly as poſſible to the treat-
" ment of nature, it is followed by none of thoſe
" formidable circumſtances which ſo ſtrongly
" mark the character of the compound fracture,
" but uſually by the inconvenience only of about
" ſix weeks confinement." Indeed this fact is ſo very common to thoſe converſant in buſineſs, that I am perſuaded, from ſeeing amputation mentioned as the only remedy, there is a miſconception of this article; for I cannot ſuppoſe any one to be ſo very ignorant, as not to know that a bruiſed and ſhattered limb, unaccompanied with a wound, will recover with very little trouble: unleſs they have precipitately taken off all the limbs they have met with thus circumſtanced, without giving themſelves an opportunity of ſeeing whether they would recover without amputation or not.

Farther, if the contuſion has cauſed a mortified ſlough, and has at the ſame time ſhattered the bones, Dr. Bilguer ſeparates the dead ſloughs from the ſound parts with a knife; ſo that his digeſtives, &c. may have proper effect; and digeſtion being promoted, the treatment common to a compound fracture takes place. And would not every ſenſible man firſt try this method, which was recommended in the days of Celſus *, under ſimilar circumſtances, inſtead of proceeding to a ſlapdaſh operation?

" Fourthly, *Wounds of the larger veſſels which*
" *convey blood into the limb, either as the only means*

* Lib. vii. cap. 10.

" *of*

" *of ſtopping the hæmorrhage, or through the ap-*
" *prehenſion the limb ſhould periſh for want of nou-*
" *riſhment.*"

Dr. Bilguer ſays, with reſpect to the crural artery at the upper part of the thigh, whether tying the veſſels can or cannot be adopted, there is no alternative, no ſurgeon, as far as he knows, having ventured to perform amputation at this part, leſt the patient ſhould expire under the operation*. Neither would the wounds of the brachial artery induce him to take off the arm at its upper part, although it be practicable, becauſe he thinks every expedient ought to be tried, before we have recourſe to this method. And as the arm recovers after the operation for the aneuriſm, when the trunk of the brachial artery has been cut through, he thinks when it is wounded, we ought to tie it without fear, then provide for the preſervation of the limb by proper applications, carefully watching the ſubſequent ſymptoms; and if, whatever is below the wound ſhri-

* Dr. Bilguer's idea of taking off the thigh at the articulation with the hip, to prevent a ſlump, is a reverie he never intended to be put into execution; becauſe he prefers, in this place, abandoning the patient to his fate, rather than to amputate in the upper part of the thigh. And thus much may be ſaid in favour of Dr. Tiſſot, about taking off the thigh at the hip, to ſtop with greater eaſe the hœmorrhage of the crural artery, that in the operation of amputating the thigh at the upper articulation, lately performed by Mr. Kerr, the crural artery was eaſily tied, without the loſs of a ſingle drop of blood. However, we do not mention this to recommend ſo horrid an operation.

vels,

vels, grows cold, and dry, we may think of amputation, without, however, being precipitate, as a mortification in this caſe is always ſlow, and ſometimes the limb recovers heat and motion very late; and (he ſays) he is convinced this caſe will very rarely require amputation. In ſupport of this opinion, his tranſlator, Dr. Tiſſot, endeavours to ſhew from anatomy, that unleſs the crural artery is wounded, almoſt at its egreſs from the arch formed by the tendons of the abdominal muſcles, its being deſtroyed will ſeldom occaſion the loſs of the limb, becauſe the branches going off from the main trunk, anaſtomiſing with it below the wound, would carry on the circulation. He ſays, experience demonſtrates, that this happens in the arm, and he thinks it is highly probable the ſame thing may happen in the thigh, becauſe the diſtribution of the veſſels of both limbs are analagous; and he obſerves, in ſome curious diſſections of dead bodies, *the crural artery has been found quite obliterated in the upper part of the thigh*, in conſequence of a morbid cauſe, without the leg having been deprived of its nouriſhment, though ſupplied, perhaps, more imperfectly.

Sed audi alteram partem.

" The above doctrine is ſo repugnant to the " univerſal ſenſe of all the ableſt and beſt prac- " titioners, to common ſenſe, and conſtant expe- " rience, that, if followed, would be productive " of much miſchief to mankind," becauſe mor-

tification and death are certain conſequences in ſome kinds of aneuriſms of the thigh, if the veſſel be tied. Which, in my opinion, are reaſons that no way invalidate what Dr. Bilguer has ſaid; becauſe a recent wound in an artery, and aneuriſms, are very different things. But as the ſubject is important, let us give it a fair hearing.

If it is inſiſted on, that by veſſels which convey blood into the limb, is meant the humeral, or fermoral artery, before it ſends off any collateral branches into the limb, we muſt obſerve, that theſe ſeem not to be parts of the veſſel Dr. Bilguer alludes to; nor does it appear that he has had experience in theſe deſperate caſes; probably becauſe the patient had bled to death before any ſurgeon could come to his aſſiſtance. He particularizes the interoſſeous, the brachial, and crural arteries, near the articulations of the elbow, or knee; and ſays, when theſe are divided, it is not neceſſary to take off the limb, becauſe, by proper dilatations, &c. the bleeding may be ſtopped *. When he ſpeaks of a wound in the trunk of the brachial artery, at the upper part of the arm, he manifeſtly means after the collateral branches are ſent off; becauſe, by comparing it with the aneuriſm, it is plain he depends upon their carrying on the circulation; otherwiſe it is not probable he would have talked of the artery juſt at its coming out of the axilla, inſtead of the part he deſcribes?

* It appears to me, that it had been uſual among the Pruſſian ſurgeons, to take off limbs on account of theſe veſſels being wounded.

And,

And, in my opinion, it is only wounds in the trunks of the arteries, after they have ſent off branches into the limb, that falls under preſent conſideration.

Now, it has long been known, that when a wound in the humeral artery has been made by bleeding, it is conſiderably above its diviſion near the elbow, of courſe the nouriſhment of the limb below muſt be accompliſhed by collateral branches higher up; and though a ligature be made much higher, they will ſtill do the ſame office, as we learn from the practice of an eminent ſurgeon *, who aſſured Mr. Cheſelden, that he had tied up the trunk of the artery, in the middle of the arm, in men wounded in battle, and that the limbs perfectly recovered. Mr. Revans, by the deſire of Mr. Gooch, tied the artery in the middle of the thigh, of a full grown young ſpaniel, including in the ligature, by deſign, the vein and nerve, but without inconvenience. For though any pulſe could not at firſt be diſcovered below, yet, excepting a little œdematous ſwelling, no interruption happened during the cure; and upon diſſection, a month after the dog was perfectly recovered, the ramifications of the branch going off above the ligature were found much enlarged, comparing them with the veſſels in the other limb; and the ſpace between the ligatures was filled up with an impervious carnous ſub-

* Le Dran's Operat. p. 456.

ſtance †. Indeed I am fearful wrong concluſions, drawn from anatomy, have here (as in other inſtances)

† The following caſe, communicated by Mr. Clover of Norwich, to Mr. Gooch, ſhews that the circulation, after tying a principal artery, is ſometimes carried on by extreme ſmall veſſels at firſt; and that, though the blood with difficulty finds its way into the uſual channel, yet a ſmall degree of circulation is ſufficient to prevent a mortification; and that nature accompliſhes this work in time.—" After having laid " the carotid artery bare in a horſe, about four inches juſt " above the breaſt, I continued the inciſion near ſix inches " up the neck, putting a ligature round the lower part of the " veſſel, and another three inches higher, cutting out the in- " termediate part of it between the ligatures, and then ob- " ſerved a very ſtrong pulſation againſt the lower ligature. " When I had gently preſſed the blood downwards, and " emptied that part of the veſſel a little way, I put on an- " other ligature, tying it no ſtraiter than juſt to bring the " ſides of the canal into contract, in order to abate the force " of the circulating fluid therein againſt the principal liga- " ture, without which precaution our deſign might have miſ- " carried.

" Dry lint, and flour, were applied to the wound, to re- " ſtrain the little bleeding which proceeded from dividing " ſmall veſſels in the operation. The dreſſings were retained " by ſtrips of common ſticking plaiſter, having previouſly " ſhaved off the hair cloſe, a ſufficient extent, and by the uſual " treatment, the wound digeſted and healed kindly, without " any ill accident ſupervening.

" When the horſe roſe, who had been well confined during " the operation, I attentively applied my fingers to the jugu- " lar vein, making as ſtrong a preſſure as is made by the " ligature in bleeding there, but found no blood in it, nor " could I, by a ſtrong ligature round the neck, raiſe the vein " at all. The day after, I made trial again, but found no

" reaſon

inſtances *) led us out of the way. For, from ſeeing the diſtribution of the arteries, when filled with wax, it has been ſuppoſed the circulation of the blood could not be carried on in the parts below, where the paſſage of the blood through the main trunk was ſtopped. Even Mr. Cheſelden † was ſo biaſſed by this theory, that he could not believe the ſurgeon, who told him that he had tied up the humeral artery in the middle of the arm, till ſome time after this diſcourſe happened, when he was convinced that this veſſel was always tied above its diviſion, in the operation for the aneuriſm after bleeding. And Mr. Sharp ſays, " we learn from experience, that a mortification

" reaſon to believe that any blood paſſed through the vein, " nor yet the next day; but the day after that, being the " fourth, the vein filled upon making the ligature in the " uſual manner, though but very ſlowly, and it was ſome " time before it could be diſtinctly felt, and when fulleſt, the " veſſel yet acquired but little tenſion, readily yielding to the " finger upon preſſure. Two days after, it roſe and filled with " blood much quicker, and, in a few days, as ſoon as the " vein on the other ſide of the neck, continuing to do ſo as " long as the horſe lived, whom I had killed ſome weeks af- " ter the wound was perfectly healed; and upon ſtrict inveſti- " gation, could then diſcover nothing worthy notice. But it " may not be amiſs to obſerve, that the horſe did not viſibly " ſuffer in any of his faculties, in conſequence of this opera- " tion, who had long been affected with an incurable diſ- " eaſe."

* About the diſlocation of the thigh; about trepanning upon the longitudinal ſinus; and about cutting through the ſphincter ani, &c. all which, practice put to rights.

† Le Dran's Op. p. 456.

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" is ſeldom the conſequence of tying the artery " in the arm, though it ſhould, from appear- " ance, be the perpetual one. Theſe aneuriſms " following always upon bleeding the baſilic " vein, muſt neceſſarily be aneuriſms of the hu- " meral artery, an inch at leaſt above the divi- " ſion, which being obſtructed by the ligature, " one would think, muſt neceſſarily bring on a " mortification, but *we ſee the contrary* *;" as every body knows from their own experience; and we no longer have the amputating inſtruments in readineſs, apprehending want of ſucceſs †. Nor can ſtronger facts be required to ſhew, that amputation is not always neceſſary in wounds of the larger veſſels, which convey blood through the limb; which leads us to reflect, that it is the buſineſs of anatomy to teach the nature and ſituation of the parts; and of practice, how far, and in what manner they may be cured, when injured, or diſeaſed: and accordingly, Paulus ‡, Parey ||, and ſome others, who were guided by practice only, ſpeak of tying the artery in an aneuriſm as a certain cure. If the humeral artery can be tied in the middle of the arm without inconvenience, why may not the crural artery be tied in the middle of the thigh, with the ſame proſpect of ſucceſs? for are not, as Dr. Tiſſot obſerves, the collateral branches in the thigh, like thoſe in the arm, proportioned to the

* Chirur. Treat. ch. 37.
† Ed. Med. Eſſ. vol. II. p. 228.
‡ Lib. ii. cap. 37.
|| Lib. vii. cap. 32.

ſize

ſize of the member? Marcus Aurelius Severinus, De Efficaces Medicina, part ii. fol. edit. page 46. records a caſe at which many of the faculty were preſent, where a bullet, which paſſed through the thigh, tore aſunder the crural artery, about eight fingers breadth below the groin. Thirty days after the accident, when the patient's health was greatly injured, and every thing had a deſperate appearance, the veſſel was tied; but the ligature was removed on the fourth day following the operation, that it might not occaſion putrefaction; yet the hæmorrhage was effectually ſuppreſſed, and the patient was cured in ſix weeks. Mr. Saviard gives us an inſtance, Obſ. 63, though not quite ſo circumſtantially related as might have been, where the crural artery being wounded, ſeems to have been tied in the ſuperior part of the thigh. The ſurgeons concerned were under terrible apprehenſions, that all the lower parts would mortify, by the interception of the blood that was neceſſary to nouriſh them; but the event here, as well as in the arm, ſhewed the difference betwixt *theory* and *practice*, for the patient was perfectly cured, without interruption, in ſix weeks from the time of the operation. In Mr. Burchall's caſe *, there cannot be any doubt but the patient's life and limb were preſerved by tying the femoral artery. Had Mr. Leſlie of Cork † preferred the *theory* of his colleague to experiment, their patient muſt unneceſſarily have ſpent

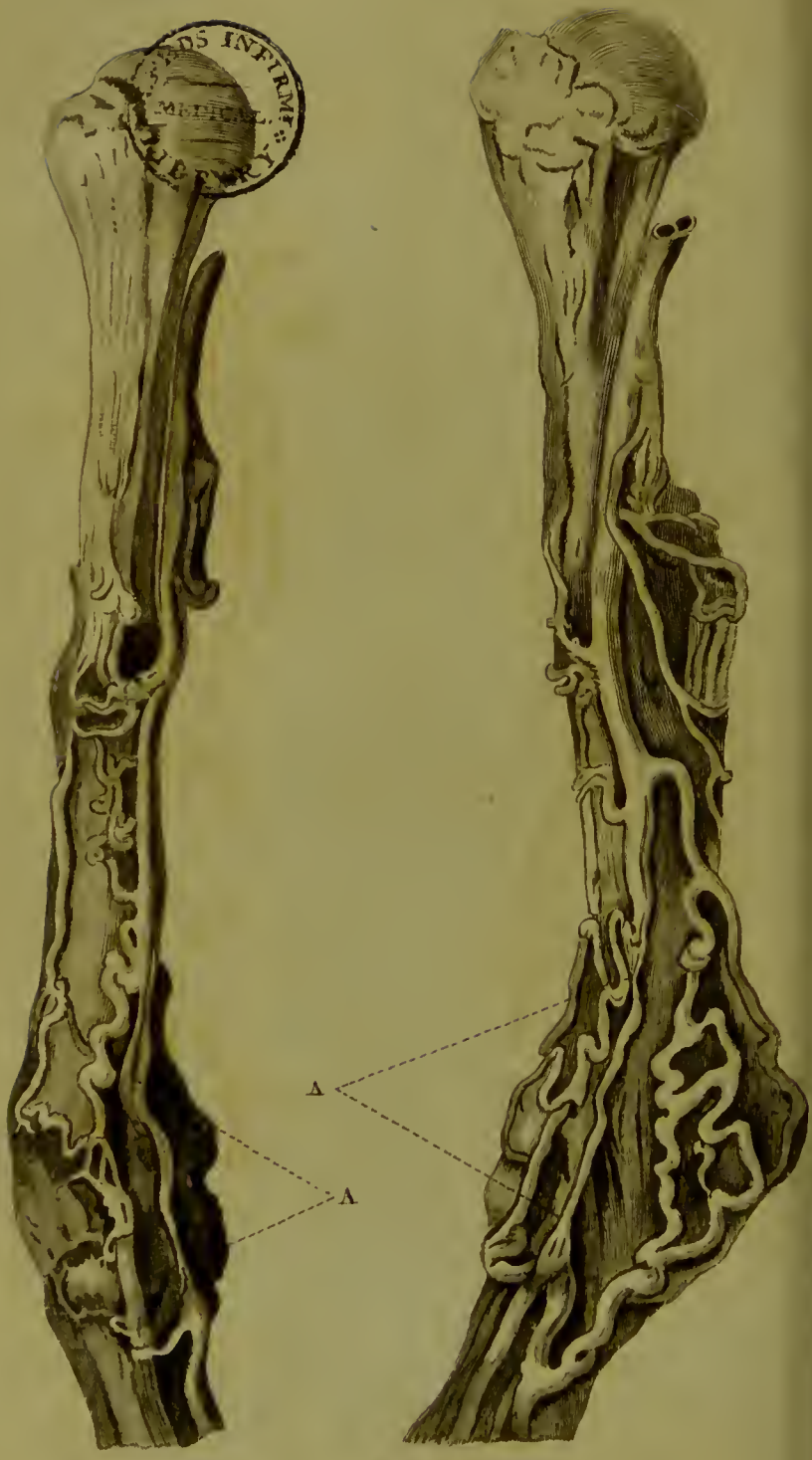
* London Med. Inq. vol. III. p. 106.

† Med. Comment. vol. II. p. 176.

the

the remainder of his days with one leg only. But we ſee, notwithſtanding the ligature round the crural artery was made very high in the thigh, how readily the part was cured. I myſelf have tied it five inches above the knee at leaſt, after which the blood inſtantly returned by the large veins in the ham, which were alſo divided. All which would encourage me to attempt the cure of an aneuriſm in this part by ligature, were it to preſent itſelf under favourable circumſtances. Nor do I think the reaſons Dr. Tiſſot has advanced in favour of this practice are to be diſregarded; becauſe, what he ſays about the collateral branches anaſtomiſing with the main trunk, and by this means carrying on the circulation, is known to be true; and perhaps it is the uſe of a few inches only of the artery, after ſome time, that is in general loſt.

Perhaps it may be ſaid, ſucceſs in theſe inſtances was probably owing to a diviſion in the artery higher than its uſual place; and that we ought nevertheleſs to amputate, on a ſuppoſition that this *luſus naturæ* does not exiſt. But if the recovery depended upon this circumſtance, a coldneſs and want of pulſe (for a time) below, would not follow ſucceſsful operations; nor could ſucceſs ſo conſtantly attend the ligature, when applied at the uſual place in the arm. I believe, from the ſlowneſs with which the blood often at firſt gets through the parts below the ligature, that the circulation is more frequently carried on by extreme ſmall veſſels, which anaſtomoſe through the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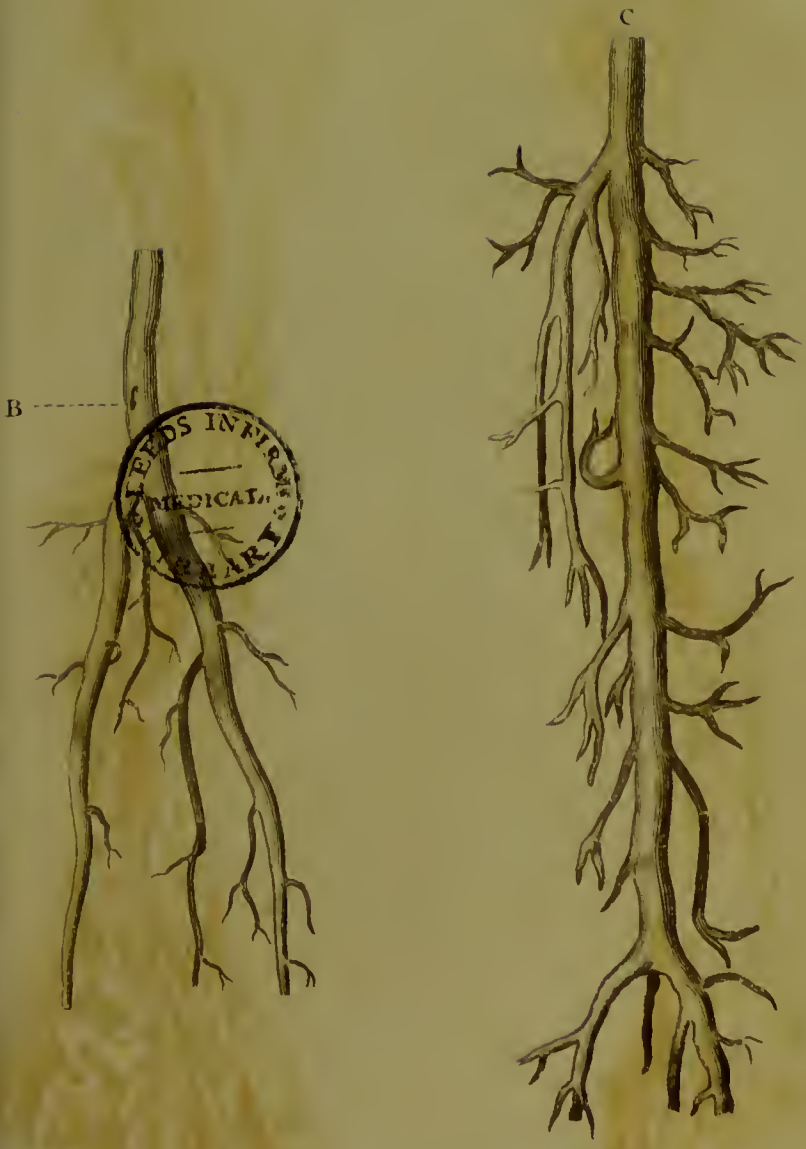
B
C

the whole limb, and are fully ſufficient for the purpoſe, when the paſſage of the blood through the main trunk (except at its entrance) is ſuppreſſed. But to have a clearer idea of this matter, I recommend a view of Mr. Cheſelden's plate, taken from Le Dran's Operations, p. 456, and to my friend Mr. White's Diſſection * of an arm, where the operation for the aneuriſm had been performed, in which will be ſeen the power of nature in dilating the capillary arteries, and continuing the circulation, when the paſſage through part of the principal artery is deſtroyed. The dotted lines at A, plate 1. expreſs the obliteration of the trunk of the artery; the figure B, plate 2. ſhews Mr. Cheſelden's opinion about the part where the ligature is made, in the common operation for the aneuriſm in the arm; and C are the arteries belonging to the thigh. If the circulation is carried on in one inſtance, when the main trunk is tied, why not in the other? And if we figure to ourſelves the ramification of theſe arteries, and remember that they anaſtomoſe with each other all over the limb, we ſhall eaſily ſee how it comes to paſs.

A more powerful argument againſt performing the operation for the aneuriſm in the thigh, may be the ill ſucceſs which has attended it in the hands of firſt rate ſurgeons; the event having always been fatal, attended with exceſſive pain, a high degree of ſymptomatic fever, great tenſion

* Caſes, ſee Plate.—There is a ſimilar inſtance in Morgani, De Sed. et Cauſis Morb. tomus II. fol. ed. epiſtol. 50. art. 7, & 8. p. 230.

of the whole limb, rapidly tending to gangrene, and ending in mortification (both upwards and downwards) having deſtroyed all thoſe, they have ſeen, on whom the operation of tying the artery was practiſed. Nor did they ever ſee any other operation than that of amputation, which preſerved the life of the patient. But perhaps theſe inſtances, whether in the thigh or ham, were all old aneuriſms, which had preſſed againſt the neighbouring parts for a conſiderable time; and poſſibly, the lower part of the limb was become, by the preſſure of the extravaſated blood, and by the obſtruction to the circulation, conſiderably loaded, and ſwoln, unfit for uſe or motion, and generally very painful; in which ſtate the very veſſels that ſhould carry on the circulation, after the principal artery is tied, are obliterated, and mortification ſeems to be an unavoidable conſequence: whereas, in the caſes before recited, the wounds and aneuriſms were recent, the collateral branches, and the ſmall veſſels connected with them, were capable of giving paſſage to the blood, and the patients were cured; from which it is rational to conclude, that when the diſeaſe is not of long ſtanding, the patient may be cured without amputation, but that amputation is the only remedy, when it has made the progreſs laſt deſcribed.

The ſame may be ſaid in wounds of the arteries. For though we imagine the limb may in general be ſaved by the collateral branches, after the principal trunk is tied, yet it ſometimes happens,

pens, that the paſſage of the blood through theſe veſſels alſo is interrupted from the violence of the injury, or the ſubſequent ſwelling. A poacher, by accident, was ſhot through the upper parts of the biceps muſcle in his left arm, by a horſe-piſtol, loaded with very large ſhot, and the humeral artery was torn to pieces. The bleeding was ſtopped in conſequence of laceration, and the whole arm was moſt violently bruiſed, from the piſtol being cloſe to it when it went off. A violent ſwelling, which ſtopped all kind of circulation in the leſſer veſſels, had they been capable of doing their office, ſucceeded, and he was dying of a mortification on the third morning, when I ſaw him. Whereas, in the caſes mentioned to Mr. Cheſelden, the artery was probably divided with but little other injury, and therefore amputation may or may not be required, as circumſtances occur, or as the accident falls under the predicaments mentioned.

Fifthly, "*An incurable caries of the bone.*"

"Which incurable *caries*," we are told, Dr. Bilguer ſays, "ought not to be amputated, be-"cauſe there is a method of curing it." And that, "if this was merely a blunder in language, "and went no farther, it would be a matter of "little importance; but it is a ſerious piece of "advice, delivered authoritatively, and by a "writer who profeſſes to correct the errors both "of his predeceſſors and contemporaries, there-"fore it ſhould not be merely laughed at; and "as it is an advice which is not built on fact,

" and which is fraught with miſchief to mankind, " ought to be contradicted." Though I have examined his book with proper attention, I can no where find him ſo ridiculous as he is here repreſented to be, or even a tittle like what we are taught to believe he has ſaid. It is true, indeed, in the paragraph immediately ſucceeding the whole ſix articles, he ſays, " his treatiſe contains an ac- " count of the methods he ſucceſsfully employed " in the military hoſpitals, for the *relief* of the " above diſorders," without diſtinguiſhing this fifth article from the reſt. But can his ſaying, that he has ſucceſsfully *relieved* incurable diſorders, do any miſchief to mankind? eſpecially as in the 38th and 39th ſections, where he treats on this ſubject, his meaning is fully explained, without any blunder to be laughed at, and without giving any ſerious piece of advice, to do what cannot be done.

The queſtion with him is, whether the limb may not be ſaved by removing the carious bone only? And that he may conſider this matter properly, he ſets it in two points of view. In the firſt, he adverts to a *caries*, when it is recent and inconſiderable; and though his theory may not quite ſquare with the Engliſh theory, or perhaps may not be quite right; yet, if the method of cure he propoſes be proper, he will not have done much miſchief, by ſuppoſing that foul bones fall off from being dry, inſtead of being puſhed off by the new fleſh, ariſing betwixt the living and dead parts: becauſe, keeping a foul bone dry, is cer-

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tainly one way of removing the impediments to nature, and, no doubt, aſſiſts the exfoliation of bones: and the powders of maſtich, myrrh, &c. which he prefers, correcting the ichor about the bone, by converting it into a tincture, renders it incapable of protracting the diſeaſe.

In the ſecond, he treats of thoſe caſes where the beſt applications fail, and where the *caries* is *very extenſive*; and when a bad habit, ſhould there be one, is corrected, inſtead of amputation, he thinks we ought to trepan "the bone in ſeveral "places, till whatever is rotten be taken away;" and not deſpair of a cure, although the *greater part of the bone* be carious, becauſe it is proved by the cure of the accidents he refers to, that the *callus* frequently fills up the whole vacuity left by the part of the bone taken out, however conſiderable it may have been. Moſt, or all of the caſes alluded to, have been long known to the faculty: yet, inſtead of making theſe hints of nature uſeful leſſons, they were looked upon as miraculous recoveries, never to be attempted by art. Has not the ſucceſs attending the ſawing off the head of the *os humeri*, in our own country *, evinced that we have ſometimes been too haſty in taking off the arm at the ſhoulder? There is now in this neighbourhood of Burton upon Trent, a man, where the head of this bone, and ſeveral inches adjoining to it, came away of itſelf, when he was a boy. The ulcer was cured by a common apo-

* Mr. Bent's Caſe. Med. Comment. Mr. White's Caſes.

thecary.

thecary. The man has a uſeful arm. The *cicatrix* now ſhews the greatneſs and extent of the diſeaſe; and nature herſelf has, in this inſtance, clearly pointed out the ſteps which ought to be taken, inſtead of taking off the limb.

Almoſt every ſurgeon muſt have ſeen recoveries with great loſs in the long bones. Nor can they forget the remarkable caſes * upon record, where the loſs of the *tibia*, and the greateſt part of the thigh bone, were ſupplied by a *callus*. I have ſeen the whole *tibia*, in a lad who came to me from Walton upon Trent, regenerated in the ſame manner. And I took the whole thigh bone, except its extremities, out of a lad eleven years of age, who next morning, in coming to be dreſſed, ran away on both his legs, as faſt as moſt lads, and cured himſelf afterwards with dry lint. But it muſt be obſerved, all theſe regenerations happened in youth, and were the work of time. The nimble-footed gentleman, juſt mentioned, firſt complained of his thigh at two years old; a caries quite through the bone, of conſiderable extent, afterwards appeared; amputation was propoſed, but not ſubmitted to; and the family contented themſelves with keeping the part as clean as they could, for more than nine years, when I was deſired to ſee him, at a gentlemans houſe, to which I was called, in Warwickſhire. In this length of time, the lower end of the bone being puſhed up

* Sculteti Arment. Chirur. Obſ. 81. Ed. Med. Eſſ. vol. I. p. 191. vol. V. p. 370. Med. Obſ. Lond. vol. II. p. 299.

by

by the *callus*, had made its way out, a few inches above the knee. Upon examining, I found it looſe, and drew it away with the utmoſt eaſe, being of the ſize it ought to be in a child of two years old. It appeared to have ſeparated at its connections with the *epiphyſes* at each extremity, and the *callus*, which ſupplied its place, felt much thicker than the bone in the other thigh, but not impeding the action of the limb in the leaſt.

In the other boy, with the diſeaſed *tibia*, I had more trouble. It had been ſeveral years carious before I ſaw him, and the leg had been condemned by ſeveral ſurgeons; but upon calling to mind the caſe in the Edinburgh Medical Eſſays, I attempted the cure, by enlarging the foul ulcers, which had ariſen in ſeveral places all down the leg, and laying the bone bare; and by degrees, with the common method of treating foul bones, the whole *tibia*, except its ends, came away, leaving a good *callus* behind, which did the office of a regular bone. Since this, in young people, where I ran no hazard of loſing my patient by the diſcharge, or by a colliquative fever from abſorbed matter, I have endeavoured to prevent the ſpreading of the diſeaſe, and committed the remainder of the work to time and nature, and commonly with good ſucceſs; even though the thigh-bone, in a boy eight years old, for inſtance, was ſo thoroughly rotten, that it broke in two, and hung perfectly looſe, farther than being ſupported by ſplints, for a great length of time. The parents kept the

ſores

ſores clean, waſhing the matter out of the ſinuſes about the bone, with an antiſeptic injection, daily; and in leſs than three years time, about four or five inches of the whole ſubſtance of the *os fæmoris* came away. But before this period a *callus* had formed, as the lad could walk about; and a perfect cure was the conſequence of time and patience. All which, I imagine, will not appear new to thoſe who have had a conſiderable ſhare of practice. Nevertheleſs, theſe inſtances are additional hints from nature, that prove a *callus* will be formed, and ſupply the place of a bone, when the greateſt part of the original bone is cut away, or thrown out by exfoliation; which is all that Dr. Bilguer aſſerts. And whoever has any doubt about this matter, I wiſh they would call to mind Dr. Mackenzie's and Dr. Hunter's * papers and drawings upon this ſubject.

Perhaps it may be ſaid, all this is well known, and no ways applicable to Dr. Bilguer's fifth article, which means a bone foul inſide and out, from end to end: but why this ſhould be imagined, may be difficult to gueſs, unleſs we ſuppoſe no bones are incurable but ſuch as are in this predicament. Nevertheleſs, the account we have given agrees perfectly with what he has ſaid, in explaining himſelf on this matter. It is a caries in *the greater part* of the bone he encourages us to try our ſkill in; and he ſeems only to mention a cure after the

* Lond. Med. Inq. vol. II. p. 229, & ſeq.

coming

coming away of the whole bone, as has been ſaid to happen *, as an extraordinary event, to ſhew that though the *bone* is incurable, the *limb* may be cured.

Now, conſiderable regenerations in bones have happened in people paſt the meridian of life, but I do not at preſent remember in them the ſame kind of ſeparation and recovery we have before ſpoken of, in ſpontaneous diſeaſes of this part of the body. Nor could thoſe advanced to this period, think of lying by ſeveral years, for a recovery; whereas in youth, time is not of the ſame conſequence, and they may wait longer in hopes of a cure. However, whether the patient be young or old, if the diſorder in the middle of the long bones is local, exfoliation, or the removal of the bone, cannot be procured, and the diſeaſe is likely to deſtroy the patient ſoon, by bringing on a colliquative fever, that cannot otherwiſe be remedied, amputation undoubtedly ought to take place; and the neceſſity of this operation, for the ſame reaſon, more particularly happens in ſcrophulous joints, of which Dr. Bilguer has not taken any notice. Yet even in this inſtance, limits ſhould be preſcribed.

When *all* the heads of the bones in a large joint become rotten, the ligaments thickened, and ſpoiled, and the air gets admittance, a horrible ſcene of pain, fever, and their attendants, ſoon

* Perhaps they have more frequently ſeparated at the epiphyſes: however, it is not a clear point, but the whole bone coming away, its place might be ſupplied with a callus, in ſome inſtances.

puts us upon removing the diſeaſed parts. On the contrary, when the pain and fever are neither of them ſo violent, as to endanger the life of the patient, I apprehend moſt ſurgeons, though they were convinced of the bones being foul, would wait and ſee whether an *anchyloſis* might not happen, as in young people, it is very well known, the diſeaſe has ſometimes terminated in this manner.

Again, a diſtinction ſhould be made betwixt all the heads of the bones compoſing a joint, and part only being diſeaſed; for in the latter inſtance, relief may, we ſee, probably be obtained, without taking off the limb. But the method is not by reſtoring the internal and medullary parts of the bone to its ſound ſtate, or by reuniting looſened epiphyſes, but by taking all the rotten bone away, and by ſuffering nature to ſupply the place in the beſt manner ſhe can. Indeed, ſo ridiculous a ſuppoſition, as reſtoring by art the medullary parts of the bone to its ſound ſtate, or of reuniting looſened epiphyſes, I do not remember to have met with till very lately; and I hope it is not meant, by advancing impoſſibilities, to ſet rational attempts to preſerve limbs, in a ludicrous light. We have before taken notice of the practice of ſawing off the head of the *humerus*; and as the lower end of this bone at the elbow, the lower end of the *radius* at the wriſt, and the lower end of both *tibia* and *fibula*, at the ancle, have been taken away when carious, in accidents, why may we not proceed in the ſame manner, when they are become

come carious by diſeaſe? When the upper end of the tibia and fibula are the only bones carious in the knee, we believe a cure will always be accompliſhed by their coming away; becauſe we have invariably, in ſeveral inſtances, ſeen this happen, where an abſceſs has formed and left a convenient drain for matter, or where an opening has been made ſuitable for this purpoſe, and care taken not to irritate the part. For, of all other diſeaſes, theſe are moſt affected by whatever frets; and a limb, which would never have been rendered incurable by the diſeaſe, may ſoon be loſt by any application which irritates and inflames. Whereas, if the part is ſtrengthened, and rendered leſs irritable, the foul bone will gradually make its way out in time.

From experiment upon a dead ſubject*, it is not doubted, but the ſawing off the head of the *os femoris* at the hip-joint, might be performed upon a living ſubject with great proſpect of ſucceſs; and would, no doubt, be preferable to the operation of taking off the thigh at this part †. But either of them, I believe, is very ſeldom neceſ-

* Mr. White's Caſes in Surgery, p. 66.

† There is an inſtance in the Philoſ. Tranſ. No. 466. p. 270. of an abſceſs in the articulation at the hip, of a girl fourteen years of age, which broke, and the ſurgeon afterwards dilating the opening made by nature, extracted the whole head of the *os femoris*. By injecting tincture of myrrh, and uſing a bandage, ſhe was cured in ſix weeks, ſo that ſhe could walk freely, though with halting. And if nature could make ſo complete a cure, by forcing off the head of the bone, why ſhould not art, when neceſſary, imitate her?

ſary; for though the upper part of the thigh-bone be very foul, yet if we attend to ſtrengthening, and leſſening the irritability of the circumjacent parts, it will by degrees work its way out. But we have no inſtances, that I know of, which ſhew that the lower part of this bone at the knee, ſuppoſing it to be the only part carious from a ſcrophulous taint, could be removed in the ſame manner with advantage to the patient; and if the ſymptoms from it endanger his life, I am fearful amputation will ſtill be the beſt remedy.

" Sixthly, *If any part is attacked with a cancer,* " *or in danger of being ſo, it is cuſtomary to take it* " *off.*"

This, Dr. Bilguer admits, is right, when the diſorder is recent; but if it is put off from time to time, he ſays, it accelerates death, or the virus falls upon another part, which is often true. Nevertheleſs, I do not think the ſucceſs from the operation depends altogether upon the diſeaſe being recent, or of long ſtanding, but upon its being local; becauſe it not unfrequently returns, when the ſchirrhus is removed in its infancy. And yet a perfect cure is frequently accompliſhed, when it has gradually made its appearance for ſeveral years, probably owing to its being ſo circumſtanced, as not to communicate its virus to the neighbouring parts. I take it to be a glandular diſeaſe *ſui generis*, and, like the ſcrophula, for inſtance, ſometimes affecting a gland or glands, in one part only, and ſometimes many in the body at the ſame time. Sometimes a ſchirrhus is encyſted, ſo

as

as not to have any communication with the neighbouring parts; at others, there is no obſtruction to its virus being diffuſed and abſorbed; and upon theſe differences the fate of the patient ſeems to depend. But unleſs it is local, the operation cannot take place with proſpect of ſucceſs; and perhaps the beſt we can do under ſuch circumſtances, notwithſtanding what has been ſaid of hemlock *, is to remember the caution of Celſus, that the diſeaſe be not irritated by imprudence, but that ſuch mild remedies be applied, as will ſooth, or, as we now ſay, leſſen the irritability of the part. Even the practice of keeping a ſchirrhus warm, by the application of hare-ſkin, and the like, manifeſtly increaſes, while a topical cold

* I think it is now generally allowed, that hemlock is not ſucceſsful in the cure of cancers; and I have had a late inſtance in a woman out of Northamptonſhire, where, by irritating, it manifeſtly increaſed a cancer in the breaſt. By her own account, ſhe took, in various ways, for almoſt a year together, an incredible quantity of this remedy, and a hemlock poultice was applied to the affected part at the ſame time. Never was greater excoriation, and not only upon the breaſt, but even upon her ſide, where the cataplaſm had lain, cancerous excreſcences aroſe, reſembling unripe mulberries. If a remedy ever did miſchief, it certainly did miſchief in this inſtance; and whoever examines properly a true ſchirrhus, or a cancer, after it is removed from the body, muſt give up their ſenſes, if they can be made to believe, that it ever cured either of theſe complaints. An induration, indeed, which has been miſtaken for a ſchirrhus, may have diſappeared under its uſe, and continued it in practice: but this is a very different complaint, admits of cure by a variety of remedies, and is no reaſon for our loſing time, in a diſeaſe where it cannot do any good.

bath,

bath, in general, keeps back the diſeaſe. And thus ends my comment on a writer, who, I find, has been very little read in this country. Perhaps the key I have given may raiſe a curioſity in ſome to look him over; and I will venture to ſay, that a thinking mind will receive advantages from many things in his work which I have overlooked, becauſe they are foreign to the plan in purſuit.

RECAPITULATION.

FROM the whole of what has been ſaid, it ſeems to appear:

Firſt, That in mortifications which ſpread to the bone, amputation, when neceſſary, ſhould not take place, till we can apply the ſaw betwixt the living and dead parts; and that this mode of amputating in this inſtance ſhould, if poſſible, be preferred.

Secondly, In compound fractures of the long bones of the extremities, we ſhould act on the ſide of probability. If there is a probability of the limb being ſaved, we ſhould attempt to ſave it; but if there is no hope of a cure without amputation, it ſhould take place without loſs of time,

time, giving preference, as often as opportunity offers, to the method of removing the limb at the injured part; and in all this we ſhould be directed by experience, without ſuffering ourſelves to be guided by conjectural reaſoning, or to be alarmed with the frightful appearance of a deſperate caſe.

Thirdly, If compound fractures of the joints do not come within the predicament in p. 4, and the head or heads of the bone can be conveniently taken away, or if there is a large opening, ſo that no matter can lodge, or air be confined, a cure will often, or for the moſt part, happen. Whereas, if great ſuppuration in the membranes and tendons, with foul bones, and a colliquative fever, follow, amputation of the limb will generally be unavoidable, to preſerve life.

Fourthly, If care has not been taken to preſerve the patient's ſtrength, and the ſtrength of the limb, in compound fractures, from the beginning, and after ſeveral weeks, he ſhould be in the ſtate mentioned at p. 26. we may be obliged to have recourſe to amputation, as a doubtful remedy is better than none.

Fifthly, Daily experience, and the concurring teſtimony of eminent men evince, that violent contuſions in the ſoft parts, with ſhattered bones, unaccompanied with a wound, may moſtly be cured without amputation.

Sixthly, It is not neceſſary to amputate on account of a wound, or a ſimple diviſion of the main trunk of an artery, carrying blood through a limb, except it be made above where the veſſel ſends off collateral

collateral branches; and when this happens in the *axilla*, it ſhould, ſeemingly, take place, to prevent a mortification. The ſame may be ſaid in recent *aneuriſms*, ariſing from injury done to the artery. But in old *aneuriſms*, or in wounds of the principal trunk of the arteries, where the collateral branches are at the ſame time ſo obſtructed from the injury, that a circulation cannot be carried on, timely amputation may prevent mortification, and preſerve the life of the patient.

Seventhly, In a caries of the cylindrical bones, the limb may be preſerved, although the greateſt part of the bone be taken away. Even where the heads of the bones in a joint are foul, but unattended with pain, or fever, that may endanger the life of the patient, we may wait with patience in hopes of an anchyloſis taking place. And when only one ſide of the joint is affected, we may moſt frequently cure the patient without the loſs of the limb, by removing the diſeaſed bone.

On the contrary, if the exfoliation or removal of the long bones cannot be procured; after a colliquative fever remedied by dilatations, proper dreſſings, and proper internal medicines; or where the heads of all the bones in a joint are become foul, the ligaments, &c. thickened and ſpoiled, and great pain, fever, and their attendants, invade the patient, amputation muſt take place, or he will probably die.

Eighthly, In local *ſchirrhi* extirpation will be ſucceſsful, but when glands are ſchirrhous in ſeveral parts of the body at the ſame time, or when the

the whole body is contaminated by the abſorption of cancerous virus, from a local ſchirrhus, or cancer, death only can be expected. Beſides theſe, there are other diſeaſes, ſuch as different kinds of anomalous tumours, &c. which may ſo perfectly deſtroy the limb upon which they are ſeated, that nothing but the removal of it can do ſervice. But we again inſiſt on what we firſt principally contended for, that in private country practice, where the limb is properly treated, gangrenes, or a great diſcharge of matter in bad compound fractures, are ſeldom fatal; that amputation is very rarely neceſſary in theſe accidents. And we think thoſe muſt have been very unfortunate, whoſe experience has led them to be of a contrary opinion.

A

SHORT ESSAY

ON THE

USE OF OPIUM

IN

MORTIFICATIONS.

THE effects of the bark in gangrenes, arising simply from inflammation and obstruction, soon induced me to suspect its use, in the beginning of mortification thus brought on. Wherefore I joined nitre along with it in these instances; and in time, being well convinced that it did harm, I laid it aside when such cases occurred, and had recourse to the antiphlogistic assistants; notwithstanding, I have still an high opinion of the use of the bark, where the disease arises from a gangrenous disposition of the juices.

It had frequently happened in the course of my practice, that I had seen opium abate local inflammation, and knowing the necessity of using a remedy that would be speedy in its effects on this occasion, I joined it along with the other antiphlogistics I employed; and after considerable experience,

rience, I am firmly perſuaded it does good ſervice in thoſe mortifications in which the bark, by increaſing the vigour and action of the ſolids, manifeſtly does injury. However, before I arrived at that knowlege concerning this matter, which repeated experience only can give, I communicated my obſervations to ſeveral of the faculty, with whom I had the pleaſure of converſing: and in a converſation on this ſubject, Mr. Parrott of Birmingham informed me, many years before any thing was made public about the uſe of opium in mortifications of the feet and toes, that he had cured an old man of this diſeaſe, by large doſes of this medicine, and that it was now become his general practice in ſimilar inſtances. And I know he was free in communicating this knowledge to all his acquaintance. Since this practice has been more publicly known, I have had more frequent opportunities of learning its effects: and after giving an account of the method of treatment I have purſued, in mortifications occaſioned by, or attended with high inflammation, I ſhall relate the obſervations I have made on the uſe of opium in the other inſtances in which it has been found to do ſervice.

In mortifications ariſing merely from inflammation and obſtruction, I have ſometimes bled, more frequently purged with neutral ſalts, without bleeding; and on the intermediate days of purging, I have given the common ſaline medicines uſed in febrile complaints; but to all theſe I have joined doſes of opium. In the firſt inſtance, that

the purges might remove inflammation and obſtruction, without irritating the ſyſtem too much; and in the ſecond, that the degree of irritability and heat might be leſſened at the ſame time. But when the ſaline medicines were given every three or four hours, I gave only ſmall doſes of laudanum, and thus, by degrees, introduced into the habit a ſufficient quantity for the purpoſe, without any ſort of inconvenience. When the inflammation begins to abate, ſpirit of ſalt, being a cooling and powerful antiſeptic, ſupplies the place of neutral ſalts. Spirit of nitre, juice of lemon, a little ſugar, and a proper quantity of water, are uſed for common drink; and when the ſeparation of the mortified parts begins to take place, and not before, the bark is given.

To the affected part, emollient neutralized cataplaſms, which purge the ſkin (if I may ſo call it) without irritating too much *, are applied. Theſe greatly aſſiſt in abating inflammation and its conſequences. The veſſels are ſtill unloaded, if neceſſary, by inciſions of proper length being made boldly down into the cellular membrane, &c. but to the parts which are actually mortified, antiſeptics are applied, to correct the acrimony in them, and thereby to prevent, if poſſible, the ſpreading of the diſeaſe. And though it is impoſſible to ſay what ſhare opium has in the cure,

* This may be made of the bread and milk poultice, Glauber's ſalts, and vinegar of lead; for, by joining ſtimulants and ſedatives together, we leſſen irritability, and unload the veſſels at the ſame time.

yet

yet I have not any doubt of its doing good ſervice, for the reaſons already given, and becauſe of the ſpeedy effects I have obſerved, where bark and the common methods have been found ineffectual.

I wiſh it could be ſaid, that the uſe of opium is as frequently followed with ſucceſs, in mortifications of the feet and toes; but it is impoſſible, as the diſorder is often incurable. Beſides, though under proper regulations, I believe it to be a moſt powerful remedy in this diſeaſe, yet it will ſometimes increaſe it; nor is it always alone ſufficient to accompliſh a cure, which may be accompliſhed by the aſſiſtance of other remedies. Its being given in large doſes will frequently fruſtrate our intentions; and it may alſo be rendered uſeleſs by improper applications to the part.

I do not remember ever ſeeing one inſtance of opium ſucceeding in the cure, or in the mitigation of this complaint, where fomentations and turpentine digeſtives were uſed: and I do believe, we might preſcribe it to eternity without ſucceſs, were no alterations to be made in theſe particulars; becauſe I am very certain, fomentations, of whatever kind they may be, increaſe putrefaction in ſores; and that in this mortification, when a red line has pointed out a diſpoſition in the diſeaſe to ſtop, a repetition of the fomentation has frequently interrupted nature in her progreſs towards a cure, and aſſiſted in haſtening the patient to his grave, eſpecially when aided with thoſe dreſſings which invite a flux of humours to the part.

Seemingly,

Seemingly, the uſe of opium in this inſtance is in leſſening the irritability of the affected part; becauſe pain is not capable of bringing on either inflammation, or ſphacelus, as pain itſelf evinces. And why ſhould not our ſedatives be applied immediately to the affected part? Lenients, indeed, have been recommended, and I have not the leaſt doubt, but ſoaking the foot and ancle in warm milk, and applying a ſimple emollient poultice, is a method preferable to that commonly uſed; and the patient will often derive much advantage from its eaſing pain. Nevertheleſs, remedies being mild and ſoft, and lying eaſy upon the part, are not ſufficient; they ſhould not only have a property of procuring eaſe, by taking off tenſion, but they ſhould have an innate property of leſſening the irritability of the nerves; and for this purpoſe verious ſedatives may be neceſſary, as preternatural ſenſation does not always give way to the ſame remedy. Opium, it is true, in general leſſens all kinds of preternatural irritability for a time, but the diſeaſe occaſioning this affection can often only be entirely removed by the native balſams, eſſential oils, and the like. Pitch has a powerful ſedative quality, and an ointment of thin conſiſtence, made of this ingredient, a ſmall quantity of wax, and a large quantity of oil, will, for the moſt part, be found a remedy, perfectly capable of allaying, without inconvenience, that kind of irritability which commonly prevails in this diſeaſe; and by mixing tincture of myrrh, or the like,

along

along with it, we have a good antiſeptic for the parts, where, on account of the ſphacelus, antiſeptic dreſſings are required. If a proper quantity of opium is added to the bread and milk poultice, which covers the whole, it will be found a better remedy than the ſimple poultice alone. In ſome caſes, an anodyne emollient cerate, made of diachylon, the powder of marſh-mallow leaves, or linſeed flour, a little wax, opium, pitch, and oil, ſhould be preferred.

By this method of proceeding, there is leſs neceſſity for taking large doſes of opium, which very frequently bring on a drunken delirium, make the patient ſick, take away appetite to all kind of food, and thus do miſchief inſtead of good, as is evident from their no way ſtopping the progreſs of the diſeaſe, when they have theſe effects. Whereas, ſmall doſes frequently repeated, will gradually leſſen nervous irritability, without theſe inconveniencies. And this I can aver, that I have repeatedly ſeen this kind of mortification recover under the uſe of anodyne topics, when we were obliged to leave off giving opium, becauſe it brought on a delirium, and took away the appetite, without producing any good effect: and it may, I think, be laid down as a rule, that unleſs the patient can eat a mild, nouriſhing food, there will be but ſmall hopes of a cure.

The particular kind of mortification in the toes, &c. in which this treatment has been found ſucceſsful, ſeems to be that which we ſhall hereafter ſpeak of, ariſing from an acrimony in the juices, and requires

requires other medicines beſides opium. I many years ſince read an author, I cannot now refer to, who adviſed mercury in the cure of mortifications in the feet and toes of old men, becauſe, he ſaid, they aroſe from the ſcurvy *. And ſome years ſince, being foiled in an attempt to cure a mortification in the toes and foot of an old gentleman at Retford, I communicated this information to the late Dr. Booth, who had the immediate care of the patient; and I had the pleaſure of reading in a letter from him ſoon after, that he had recourſe to a ſolution of ſublimate, and that though the diſeaſe had ſpread to the middle of the foot, yet it ſoon ſtopped, after he began to take this medicine; and we followed the practice, which has been long well eſtabliſhed, of ſuffering the dead parts, without ſcarifying, to drop off of their own accord, with perfect ſucceſs. Since this, a perſon under my care, in a ſimilar inſtance, recovered, while the ſedatives mentioned were applied, and an electary taken, compoſed of bark, gum guaiacum, and cinnabar of antimony, after opium by the mouth had been fairly tried, without any good effect. But though we were obliged to lay it aſide, on account of its diſagreeing with the patient, yet ſmall doſes, in the manner deſcribed, may be joined to alteratives with advantage.

* The word Scurvy has been applied to a variety of diſeaſes, which have no affinity to each other; and I only underſtand it in this inſtance, as a particular kind of acrimony, which mercury will correct.

Nevertheleſs,

Nevertheleſs, though we approve much of ſedatives in the diſeaſes we have deſcribed, yet there is a mortification in the feet and toes of old people, in which they appear to me to do injury. A month after a froſt and ſnow, in January 1776, an active farmer, eighty years of age, was ſeized with a black ſpot upon the end of his great toe: preſently the cuticle began to ſeparate, and a ſphacelus, in ſome time, extended itſelf to the foot, and neighbouring toes, till they were all deſtroyed. During the progreſs of the diſeaſe, the faireſt trial was given to opium. At firſt he took a grain twice a day, preſently double this quantity, then the ſame doſe every four hours, and afterwards oftener, for a month; but the diſorder daily gained ground under mild applications, and his health became ſo greatly injured, that we ſuffered him to return home, leaving off all kinds of medicines, and we had very little hope of his recovery. Nevertheleſs, we ordered him to drink wine, to live upon a generous diet; and to the foot, a mild digeſtive, and the ſtale beer poultice, were daily applied; but he gave preference to their own malt liquor, and lived in common with the family: and thus he went on for a month at leaſt, without any conſiderable alteration; but in the end, his health amended, the mortification ſtopped, above half his foot dropped off, and he is now in good health. In this caſe, then, which comes within the deſcription given of the mortification of the toes and feet, I am perſuaded opium did harm; and if we reflect upon the mat-

ter, will it not ſeem probable that it muſt always do harm, where nervous influence is leſs powerful than it ought to be? In a man of eighty, notwithſtanding he was very active at that time of life, the *vis vitæ* muſt of courſe be weakened. The cold, as he told me, had a powerful effect upon both feet, and perhaps, by deſtroying the remains of nervous energy in one of them, the mortification was brought on, and afterwards in ſome degree ſpread, by the aſſiſtance of opium; becauſe it ſtopped when the opium was laid aſide, and a little vigour given to the habit. To prevent, therefore, an indiſcriminate uſe of this medicine, in all mortifications of the parts we have been ſpeaking of, we will more clearly, as far as our preſent experience enables us, diſtinguiſh the caſes in which ſedatives may do ſervice, and thoſe in which they ſhould not be employed.

It is eaſy to conceive, that in people advanced in life, who have not been very temperate in eating or drinking, or in both, the juices may have acquired acrimony; and accordingly the diſeaſe in queſtion ſeems ſometimes to ariſe from this cauſe, accompanied with an extreme degree of irritability of the part, which may perhaps be owing to the conſtant irritation which ſuch a ſtate of the juices, when they once ſtagnate, muſt occaſion: and in which ſtate, opium and the alteratives mentioned, ſeem to be proper.

It begins with a black or blue ſpot, ſomewhere about the toes; the cuticle ſeparates, a lividneſs appears underneath, the diſeaſe gradually extends itſelf

itſelf to the foot, and the ulcer which follows has ſometimes different appearances, in different parts, at the ſame time. In one part, perhaps, there is a perfect ſphacelus; in another, new fleſh appears; and in a third, the lips of the ſore are tucked in, and ſeem to be conſtantly eaten away by a corroſive ichor. Pain, more or leſs, is a conſtant attendant; inflammation, and a ſwelling of the parts, is not uncommon; a moſt certain criterion is the ſenſibility of the parts of the ulcer which are alive, and the pulſe is quickened in proportion to the degree of inflammation which prevails.

On the contrary, when the mortification ariſes from the *vis vitæ*, or nervous energy, being deſtroyed, a perfect ſphacelus keeps ſpreading forward; the parts die apparently without corroſion, and there are no ſigns of an acute ſenſation when they are touched; all which ſeem to evince, that ſedatives in this inſtance cannot afford relief. In ſhort, wherever irritation has a ſhare in increaſing gangrene, they will be uſeful. When death, in a particular part, is the conſequence of a deficiency in the nervous energy, warm and invigorating remedies are preferable: but when a mortification in the extremities, as often happens, comes on; where nature is worn out, and incapable of aſſiſting us, what can be expected from art?

FINIS.

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